PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference A3-043PCT	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US 03/23934	International filing date *(day/month/year)* 31.07.2003	Priority date *(day/month/year)* 31.07.2002
International Patent Classification (IPC) or both national classification and IPC H01R43/24		
Applicant MOLEX INCORPORATED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
24.02.2004	20.08.2004
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Tappeiner, R Telephone No. +49 89 2399-7915

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US 03/23934

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-9 as originally filed

Claims, Numbers

1-15 filed with telefax on 24.02.2004

Drawings, Sheets

1/17-17/17 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-15
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-15
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations

   see separate sheet

cf. V.2

1. D1: DE 297 09 031 U (AMPHENOL TUCHEL ELECT) 17 July 1997
   D2: US-B-6 302 7361 (HORI KATSUHIRO ET AL) 16 October 2001
   D3: US 2001/049225 A1 (CHIRAN KIYOHIKO ET AL) 6 December 2001

2. The **closest prior art** is D1, (the references in parentheses applying to this document) disclosing an electrical connector comprising a shield case (Hülse 31, see page 7 lines 4-5) covering an insulative housing (4) mounting a plurality of terminals, each of the terminals having a contact piece and a terminal piece (crimping portion), the terminal piece being capable of being connected to an electric wire, an overmolding portion for securing the shield case along with the cable to shape the electrical connector, the shield casing having a tube-like portion engaging with a portion of the insulating housing (4), the tube-like portion including a bending piece (see Fig. 5, the piece enclosing the wires) externally projecting from an edge of the tube-like portion,
   from which the subject-matter of claim 1 differs in that:
   the terminal piece extends from the insulating housing in a direction away from the contact piece.

3. The **objective technical problem** is to provide an alternative construction of the shield casing.

4. The **solution** is provided by the features of claim 1, defining i.a. that the terminal piece extends from the insulating housing in a direction away from the contact piece.

5. Document D1 does not disclose a shield casing with a box-like portion internally receiving a portion of the terminal piece nor does it disclose that the terminal piece extends from the insulating housing in a direction away from the contact piece.
   Document D2 does not disclose that the terminal piece extends from the insulating housing in a direction away from the contact piece (the insulating housing extends further than the contact piece in direction away from the contact piece).
   Document D3 does not disclose an overmolding portion for securing the shield

case along with the cable to shape the electrical connector and a tube-like portion including a bending piece externally projecting from an edge of the tube-like portion.
Thus the subject matter of claim 1 is therefore **novel** (Article 33(2)PCT).

6. Documents D3 discloses an "L" shaped connector with a terminal piece extending from the insulating housing in a direction away from the contact piece, a shield casing with a box-like portion that receives a portion of the terminal piece and a tube-like portion connected via a continuos piece to the box-like portion.
To provide the connector with an overmolding portion (known from D1 and D2) and a bending piece externally projecting from an edge of the tube-like portion (known from D2) and embedding both, the bending piece and the continuos piece in the overmolding portion is **not obvious to the man skilled in the art** since both changes are not completely independent from each other.
Starting from documents D1 or D2 would not lead to a connector according to claim 1 since the insulating housing would have to be changed in a way not obvious to the man skilled in the art.

Therefore, claim 1 meets the requirements of Article 33(3)PCT.

7. Consequently, since the available prior art and the general knowledge of the skilled man do in no way indicate the subject-matter according to claim 1, it is **novel and not obvious.** Therefore, claim 1 meets the requirements of Article 33(2) and (3) PCT.

8. Claims 2-15 are dependent on claim 1, and do therefore also comply with the requirements of Article 33(2) and (3) PCT.

9. The invention according to claims 1-15 is industrially applicable, these claims therefore complying with Article 33(4) PCT.

CLAIMS:

What is claimed is:

1. An electrical connector comprising:

a shield case for covering an insulative housing mounting a plurality of terminals, each of the terminals having a contact piece and a terminal piece, at least a portion of the terminal piece extending from the insulative housing in a direction away from the contact piece, the terminal piece being capable of being connected to an electric wire of a cable;

an over-molding portion for securing the shield case along with the cable to shape the electrical connector;

the shield casing having a tube-like portion engaging with a portion of the insulative housing and a box-like portion internally receiving at least a portion of the terminal piece and the electrical wire of the cable;

the tube-like portion and the box-like portion being connected via a continuous piece, the tube-like portion including a bending piece externally projecting from an edge of the tube like portion, the continuous piece and the bending piece being embedded in the over-molding portion.

2. An electrical connector as set forth in claim 1, wherein the tube-like portion is a quadrangular tube-like portion, wherein one wall being continuous with the box-like portion via the continuous piece, and three walls being provided projecting the bending piece.

3. An electrical connector as set forth in claim 1 or 2, wherein the continuous piece is bended to make the center of the quadrangular tube-like portion substantially consistent with that of the box-like portion.

4. An electrical connector as set forth in claim 1 or 2, wherein the electrical connector is formed into a L-shape configuration in which the direction of extension of the cable is intersected with the direction of extension of a mating end of the insulative housing surrounded by the shield case at approximately right angle.

5. An electrical connector as set forth in claim 1, comprising:

a shield cap mounted on the shield body,

a strip tab extending from the box-like portion, an end portion of the strip tab being

provided with a cable clamp, a depending piece extending from the shield cap, and a cable holder being provided at the end portion of the depending piece, and

the cable clamp commonly clamping the cable and the cable holder.

6. An electrical connector as set forth in claim 5, wherein the shield cap is formed with a quadrangular plate smaller than an opening portion of an end portion of the box-like portion, bent continuous pieces extending from an upper edge and a side edge of the quadrangular plate, and the depending piece depending from a lower edge of the quadrangular piece, and a gap being formed between the upper connecting piece and the lateral connecting pieces, and between the depending piece and the lateral connecting pieces.

7. An electrical connector as set forth in claim 6, wherein the quadrangular plate of the shield cap, the continuous pieces and the depending piece closes the end opening portion formed in the box-like portion of the shield body.

8. An electrical connector as set forth in any one of claims 5 to 7, wherein the tube-like portion and the box-like portion are continuous via the continuous piece, a bending piece extends externally from the end edge of the tube-like portion, the continuous piece and the bending piece are embedded in the over-molding portion, and resins of the bending portion and the over-molding portion are engaged.

9. An electrical connector as set forth in claim 8, wherein the tube-like portion is a quadrangular tube-like portion, wherein one wall being continuous with the box-like portion via the continuous piece, and three walls being provided projecting the bending piece.

10. An electrical connector as set forth in claim 8, wherein the continuous piece is bended to make the center of the quadrangular tube-like portion substantially consistent with that of the box-like portion.

11. An electrical connector as set forth in claim 8, wherein the electrical connector is formed into a L-shape configuration in which the direction of extension of the cable is intersected with the direction of extension of a mating end of the insulative housing surrounded by the shield case at approximately right angle.

12. An electrical connector as set forth in claim 1, wherein the insulative housing includes a housing body formed with terminal receiving spaces, and a housing cap formed with terminal insertion holes;

rear end opening portions of the terminal receiving spaces formed in the housing body being sealed by the housing cap; and

terminal pieces of the terminals mounted in the terminal receiving spaces rearwardly extending through the terminal insertion holes of the housing cap.

13. An electrical connector as set forth in claim 12, wherein the housing body includes a rear end surface having openings for the terminal receiving spaces, and the housing cap includes an abutting surface for abutting against the rear end surface, so that the rear end opening portions of the terminal receiving spaces are sealed by abutting the abutting surface against the rear end surface.

14. An electrical connector as set forth in claim 12, wherein the housing cap includes a supporting surface for supporting terminal pieces rearwardly exposing through the terminal insertion holes.

15. An electrical connector as set forth in claim 14, wherein the supporting surface includes separation projections for isolating adjacent terminal pieces.